IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application Serial No. 09/524,804
Filing Date . . . . . March 14, 2000
Inventor . . . . . Mark E. Tuttle
Assignee . . . . . Micron Technology, Inc.
Group Art Unit 2635
Examiner . . . . . M. Shimzu
Attorney's Docket No. MI40-285
Title: Wireless Communication Devices, Radio Frequency Identification Devices, Methods of Forming a Wireless Communication Device, and Methods of Forming a Radio Frequency Identification Device

LETTER EV633265660

To: Mail Stop Appeal Brief-Patents
Commissioner of Patents
P.O. Box 1450
Alexandria VA 22313-1450

From: James D. Shaurette (Tel. 509-624-4276; Fax 509-838-3424)
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Sir:

Appellants wish to thank SPE Horabik for his assistance with respect to the filing of Appellant's response to the reopening of the prosecution by the Office in the present application by the Office Action mailed July 11, 2005. As indicated to SPE Horabik, Appellants wish to proceed with the Appeal and it was indicated that no additional Notice of Appeal is due in view of the previously filed Notice. The undersigned also questioned the identification of the newly rejected claims as set forth on page 2 of the Office Action dated July 11, 2005 and SPE Horabik indicated that the identification is improper and

claims 65, 84, 86, 88, 90, 92, 94, 96 and 98 are the newly rejected claims over Brady.

Pursuant to the Office Action dated July 11, 2005, Appellants file a revised Appeal Brief herewith to address the new rejections of claims 65, 84, 86, 88, 90, 92, 94, 96, and 98 as set forth in section B of the argument section of the Appeal Brief which accompanies this filing.

If this application is not allowed in the next Action, Appellant respectfully requests continuing the prosecution of this application on appeal. More specifically, prosecution of the application was reopened after Appellant filed an appeal and had fully briefed the rejections presented by the Office. The Office reopened prosecution to change its rejections of the claims to combinations of prior art using Brady as opposed to Odagiri. *However, Appellant had previously argued against rejections over Odagiri in three previously filed responses prior to Appeal*. Appellant also interviewed Examiner Shimizu prior to appeal in an effort without success to gain more insight into the position of the Office and present positions of Appellant to further the prosecution of the application. However, the interview failed to lead to any furtherance of the prosecution.

Appellant has attempted in good faith to further the prosecution of this application but has decided to pursue the prosecution of the application on appeal as provided for by the US patent laws. Appellant respectfully submits the Office has had numerous previous chances to change or reformulate its rejections prior to appeal and for the Office to now chance rejections after Appellant has already argued against the rejections in numerous responses before appeal and in a fully prepared Appeal Brief has no sense of fairness to Appellant.

To this end, if the Application is not allowed, Appellant respectfully request that the

Office reply in a Reply Brief so prosecution of this application may appropriately proceed before the Board of Appeals.

The Examiner is requested to phone the undersigned if the Examiner believes such would facilitate prosecution of the present application. The undersigned is available for telephone consultation at any time during normal business hours (Pacific Time Zone).

Respectfully submitted,

Dated: 11/14/05

By: _____

James D. Shaurette
Reg. No. 39,833

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BRIEF OF APPELLANT

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Appellant appeals from the Office Action mailed July 11, 2005, of claims 50-52, 54-69, and 71-106. The fee required under 37 C.F.R. § 1.17(c) was paid with the original Brief filed August 16, 2004 and no fee is believed due for filing this Brief. However, if a fee or fee deficiency is due, the Commissioner is authorized to charge the fee or deficiency to Deposit Account No. 23-0925.

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I. REAL PARTY IN INTEREST.

The real party in interest of this application is Micron Technology, Inc. as evidenced by the full assignment of the pending application to Micron Communications, Inc. recorded at Reel 8778, Frames 0014-0018 in the Assignment Branch of the Patent and Trademark Office and the Notice of Merger, merging Micron Communications, Inc. with and into Micron Technology, Inc. which is recorded at Reel 010381, Frames 0287-0299 in the Assignment Branch of the Patent and Trademark Office.

II. RELATED APPEALS AND INTERFERENCES.

Appellant, Appellant's undersigned legal representative, and the assignee of the pending application are aware of no appeals or interferences which will directly affect, be directly affected by, or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF THE CLAIMS.

Claims 50-52, 54-69, and 71-106 were rejected. Claims 50-52, 54-69, and 71-106 are pending, stand rejected, and are being appealed.

IV. STATUS OF AMENDMENTS.

Appellant filed an After Final amendment on December 16, 2004 and the amendment was entered pursuant to 37 C.F.R. §1.116 to cancel claim 107.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Concise explanations of the subject matter defined in each of the independent claims and argued dependent claims involved in the appeal follow with respect to exemplary illustrative embodiments of the specification.

Referring to independent claim 50, and as shown in Figs. 2-4 of the application, an exemplary embodiment of a wireless communication device is disclosed (e.g., page 5, lines 1-2 of the specification). The wireless communication device is generally referred to as reference 10. Starting with the discussion at page 11, line 11 of the specification, the exemplary embodiment of Fig. 4 shows a housing 27 having an upper surface 40, lower surface 42, and at least one side 41 having visibly perceptible indicia 43. Page 10, lines 4+ state that integrated circuit 54 of Fig. 3 includes suitable communication circuitry. Discussion of radio frequency identification device aspects start at page 4, lines 23+ of the specification.

Referring to dependent claims 51 and 80, encapsulant 44 is shown in Fig. 4 and as set forth at page 11, lines 11+ of the specification, encapsulant 44 covers components of the device 10 including integrated circuit 54 and support surface 25 of substrate 18 shown in Fig. 3.

Referring to dependent claims 52, 57 and 74, the specification at page 4, lines 20+ state that the housing 27 may have a thickness of less than 200 mils, and preferably less than 100 mils. Page 11, lines 15+ of the specification state that encapsulant 44 and substrate 18 may define housing 27.

Referring to independent claim 54, in addition to reciting limitations described above, claim 54 recites substrate 18 shown in exemplary embodiments in Figs. 2 and 4 with

discussion thereof commencing at page 6, lines 6+ of the specification. Fig. 3 discloses a support surface 25 with discussion thereof commencing at page 7, lines 1+ of the specification. Integrated circuit 54 of Fig. 3 includes communication circuitry and encapsulant 44 is described at the teachings of page 11, line 11+ of the specification. Relationships of the thickness of the encapsulant 44 and the substrate 18 are described at page 11, lines 20+ of the specification.

Referring to dependent claims 55 and 72, support surface 25 of substrate 18 comprises a surface substantially in the shape of a rectangle in the embodiment of Fig. 3.

Referring to dependent claims 56, 73 and 81, page 11, lines 11+ of the specification and Figs. 3-4, encapsulant 44 contacts support surface 25, integrated circuit 54 and encapsulated portions of the support surface 25 of substrate 18.

Referring to dependent claims 58, 61, 75 and 78, discussion of radio frequency identification device aspects start at page 4, lines 23+ of the specification.

Referring to independent claim 59, page 10, lines 4+ discuss integrated circuit 54 including communication circuitry and the encapsulant 44 is shown in Fig. 4 and described starting at page 11, lines 11+ of the specification.

Referring to independent claim 62, and starting with the discussion at page 11, line 11 of the specification, the exemplary embodiment of Fig. 4 shows a housing 27 having an upper surface 40, lower surface 42, and at least one side 41 having visibly perceptible indicia 43. Page 10, lines 4+ discuss integrated circuit 54 including communication circuitry. The specification at page 4, lines 20+ state that the housing 27 may have a thickness of less than 200 mils, and preferably less than 100 mils.

Referring to independent claim 65, a substrate 18 is shown in Figs. 2 and 4 with discussion thereof commencing at page 6, lines 6+ of the specification. Fig. 3 discloses a support surface 25 with discussion thereof commencing at page 7, lines 1+ of the specification. Integrated circuit 54 of Fig. 3 includes communication circuitry and discussion of radio frequency identification device aspects start at page 4, lines 23+ of the specification. An exemplary power source 52 is shown in Fig. 3 and associated discussion thereof proceeds from page 8, lines 8+ of the specification for one embodiment. Fig. 3 also shows antennae 32, 34 which are described at page 7, lines 11+ of the specification. Encapsulant 44 is described at the teachings of page 11, lines 11+ of the specification. Relationships of the thickness of the encapsulant 44 and the substrate 18 are described at page 11, lines 20+ of the specification. The exemplary embodiment of Fig. 4 shows a housing 27 having an upper surface 40, lower surface 42, and at least one side 41 having visibly perceptible indicia 43.

Referring to independent claim 66, page 10, lines 4+ state that integrated circuit 54 of Fig. 3 includes suitable communication circuitry. The exemplary embodiment of Fig. 4 shows a housing 27 having an upper surface 40, lower surface 42, and at least one side 41 having visibly perceptible indicia 43. Discussion of radio frequency identification device aspects start at page 4, lines 23+ of the specification. Microwave signals are described starting at page 5, line 20 of the originally filed specification.

Referring to independent claim 71, substrate 18 is shown in exemplary embodiments in Figs. 2 and 4 with discussion thereof commencing at page 6, lines 6+ of the specification. Fig. 3 discloses a support surface 25 with discussion thereof commencing at page 7, lines 1+ of the specification. Integrated circuit 54 of Fig. 3 includes

communication circuitry and encapsulant 44 is described at the teachings of page 11, lines 11+ of the specification. Relationships of the thickness of the encapsulant 44 and the substrate 18 are described at page 11, lines 20+ of the specification. Starting with the discussion at page 11, lines 11 of the specification, the exemplary embodiment of Fig. 4 shows upper surface 40, lower surface 42, and at least one side 41 having visibly perceptible indicia 43.

Referring to independent claim 76, integrated circuit 54 of Fig. 3 includes communication circuitry and encapsulant 44 is described at the teachings of page 11, lines 11+ of the specification. Starting with the discussion at page 11, line 11 of the specification, the exemplary embodiment of Fig. 4 shows upper surface 40, lower surface 42, and at least one side 41 having visibly perceptible indicia 43.

Referring to independent claim 79, discussion of radio frequency identification device aspects start at page 4, lines 23+ of the specification. Microwave signals are described starting at page 5, line 20 of the originally filed specification. Page 11, lines 15+ of the specification state that encapsulant 44 and substrate 18 may define housing 27. Page 4, lines 20+ state that the housing 27 may have a thickness of less than 200 mils, and preferably less than 100 mils. The exemplary embodiment of Fig. 4 shows a housing 27 having an upper surface 40, lower surface 42, and at least one side 41 having visibly perceptible indicia 43.

Referring to independent claim 82, discussion of radio frequency identification device aspects start at page 4, lines 23+ of the specification. Microwave signals are described starting at page 5, line 20 of the originally filed specification. An exemplary power source 52 is shown in Fig. 3 and associated discussion thereof proceeds from page

8, lines 20+ of the specification. Fig. 3 also shows antennae 32, 34 which are described at page 7, lines 11+ of the specification. The exemplary embodiment of Fig. 4 shows a housing 27 having an upper surface 40, lower surface 42, and at least one side 41 having visibly perceptible indicia 43. Relationships of dimensions of the housing 27 are described at page 11, lines 20+ of the specification.

Referring to dependent claims 83, 85, 87, 89, 91, 93, 95, and 97, backscatter limitations are discussed at page 10, lines 24+ of the originally filed specification.

Referring to dependent claims 84, 86, 88, 90, 92, 94, 96, and 98, an exemplary power source 52 is shown in Fig. 3 and associated discussion thereof proceeds from page 8, lines 8+ of the specification which state that the power source may be a battery.

Referring to independent claims 99 and 100, starting with the discussion at page 11, line 11 of the specification, the exemplary embodiment of Fig. 4 shows a housing 27 having an upper surface 40, lower surface 42, and at least one side 41 having visibly perceptible indicia 43. Relationships of dimensions of the housing 27 are described at page 11, lines 20+ of the specification. Page 10, lines 4+ state that integrated circuit 54 of Fig. 3 includes suitable communication circuitry. Backscatter limitations are discussed at page 10, line 24 of the originally filed specification.

Referring to dependent claim 101, page 7, lines 11+ of the specification discuss receiving and transmitting electronic signals in one embodiment. Microwave signals are described starting at page 5, line 20 of the originally filed specification.

Referring to dependent claims 102 and 105, page 7, lines 11+ of the specification discuss receiving and transmitting electronic signals in one embodiment. Substrate 18 and encapsulant 44 comprising different materials are described in exemplary embodiments

at page 6, lines 6+ and page 11, lines 11+ of the specification. Encapsulation is also discussed at page 11, lines 11+ of the specification.

Referring to dependent claims 103-104, substrate 18 and encapsulant 44 comprising different materials are described in exemplary embodiments at page 6, lines 6+ and page 11, lines 11+ of the specification. Solid teachings are discussed starting at page 12, lines 1+.

Referring to dependent claim 106, exemplary flowable encapsulant details and curing are discussed starting at page 11, lines 23+ of the specification according to one embodiment.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. The 103 rejection of claims 50-52, 54-58, 62-69, 71-75, 79-98 and 101-106 over the combination of U.S. Patent No. 4,782,342 to Walton and U.S. Patent No. 5,598,169 to Drabeck.

B. The 103 rejection of claims 65, 84, 86, 88, 90, 92, 94, 96, and 98 over the combination of U.S. Patent No. 4,782,342 to Walton, U.S. Patent No. 5,598,169 to Drabeck, and U.S. Patent No. 6,100,804 to Brady.

C. The 103 rejection of claims 54-58, 65, 71-75, 80-81, 85-86, 93-94, and 103-106 over the combination of U.S. Patent No. 4,782,342 to Walton and U.S. Patent No. 5,598,169 to Drabeck.

D. The 103 rejection of claims 102-106 over the combination of U.S. Patent No. 4,782,342 to Walton, U.S. Patent No. 5,598,169 to Drabeck, and U.S. Patent No. 5,424,250 to Sawada.

E. The 103 rejection of claims 83, 85, 87, 89, 91, 93, 95, 97, 99, and 100 over the combination of U.S. Patent No. 5,649,296 to MacLellan, U.S. Patent No. 5,598,169 to Drabeck, and U.S. Patent No. 4,782,342 to Walton.

F. The 103 rejection of claim 101 over the combination of U.S. Patent No. 4,782,342 to Walton and U.S. Patent No. 5,598,169 to Drabeck.

G. The 103 rejection of claims 102-103 over the combination of U.S. Patent No. 4,782,342 to Walton, U.S. Patent No. 5,598,169 to Drabeck, and U.S. Patent No. 5,424,250 to Sawada.

H. The 103 rejection of claim 104 over the combination of U.S. Patent No. 4,782,342 to Walton, U.S. Patent No. 5,598,169 to Drabeck, and U.S. Patent No. 5,424,250 to Sawada.

I. The anticipation rejection of claims 59, 61, 76, and 78 over U.S. Patent No. 4,782,342 to Walton.

J. The refusal of the Office to initial or address a submitted form PTO-1449.

VII. ARGUMENT.

For at least the reasons herein, reversal of the rejections of claims 50-52, 54-69, and 71-106 is respectfully requested. For any one of the reasons presented herein, the rejections of the respective claims should be reversed. In combination, these reasons overwhelmingly support such reversal. Accordingly, Appellant respectfully requests that the Board reverse the rejections of claims 50-52, 54-69, and 71-106.

A. **The combination of the teachings of Walton and Drabeck in support of the obviousness rejection of claims 50-52, 54-58, 62-69, 71-75, 79-98, and 101-106 is not proper.**

Walton fails to disclose or suggest limitations of the pending claims and the Office in the Office Action mailed July 11, 2005 (hereinafter "the Office Action" without a specific date) relies upon the teachings of Drabek to support the obviousness rejection of the claims. Appellant respectfully submits that the combination of the Walton and Drabek references is improper for at least the following compelling reasons.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. See, e.g., MPEP §2143 (8th ed.).

MPEP §2142 (8th ed., rev. 2) states that the concept of prima facie obviousness allocates who has the burden of going forward with production of evidence in each step of the examination process and the *examiner bears the initial burden of* ***factually*** *supporting any prima facie conclusion of obviousness.* MPEP §2143.01 (8th ed., rev. 2) cites *In re Lee*, 61 USPQ2d 1430 (Fed. Cir. 2002), regarding motivational rationale and the importance of relying upon ***objective evidence*** and ***making specific factual findings*** with respect to the motivation to combine references. The Office has failed to establish the requisite suggestive or motivational rationale and the 103 rejections based upon the combination of Walton and Drabek is improper for at least this reason.

Pages 5-6 of the Office Action present an alleged motivational rationale for combining the teachings of Drabek with the teachings of Walton in support of the rejection of claim 82. Initially, the Office states that Drabek teaches microwave signals for the purpose of providing efficient communication. Thereafter, the Office Action states that it would have been obvious to include wireless signals comprising microwave signals in the device of Walton because Walton suggests wireless signals and Drabek teaches wireless signals comprising microwave signals for the purpose of providing efficient communication. The alleged motivational rationale is conclusory subjective belief of the Examiner with no objective or factual support in the art or otherwise, and in accordance with the MPEP and precedent of the Court of Appeals for the Federal Circuit, is improper to support a proper 103 rejection.

More specifically, the conclusory statement that Drabek teaches microwave signals for the purpose of providing efficient communication is not supported by the Drabek teachings. In fact, the Office has failed to cite any reference teachings in support of the subjective conclusory statement. Appellants have electronically searched Drabek and have only identified one reference to efficiency at col. 1, lines 25-30 and such reference clearly does not support the bald allegation asserted by the Office. The above-mentioned Drabek teachings merely state that operating an antenna at a specific impedance does improve downlink communications but does *not* result in a maximum cross-section of a wireless label needed for efficient backscattering. Drabek does not support the allegation that microwave signals provide efficient communication as alleged. Further, the record is devoid of any additional evidence to support the position of the Examiner.

Appellant submits that in accordance with the MPEP and *In re Lee*, the Office has failed to establish a proper motivational rationale for combining the reference teachings. The Court in *In re Lee* stated the factual inquiry whether to combine references must be through and searching, must be based on objective evidence of record and can not be resolved on subjective belief and unknown authority. *Id.* at 1433-1434. The Court also stated that deficiencies of cited references cannot be remedied by general conclusions about what is basic knowledge or common sense. *Id.* at 1434-1435. In the instant case, the record is entirely devoid of any evidence to support motivation to combine the teachings apart from the bald unsupported conclusory statements of the Examiner which are insufficient for proper motivation as set forth by the Federal Circuit. The Office cannot rely on conclusory statements when dealing with particular combinations of prior art and specific claims but must set forth objective rationale on which it relied.

Initially, there is absolutely no evidence of record to support the subjective conclusory statement of the Examiner that the any efficiency in communications would result from applying teachings regarding microwave communications (i.e., Drabeck) to a system which is based upon inductive magnetic communications (i.e., Walton). There is no evidence of record that the disparate teachings of the microwave system of Drabek may be combined with the teachings of the inductive magnetic system of Walton to yield an operable communication system let alone one which yields improved efficiencies. As set forth by the MPEP and Federal Circuit, there is no motivation and the Office has failed to meet the burden of establishing a *prima facie* case of obviousness and accordingly the 103 rejection based upon the combination of the teachings of Drabek with the teachings of Walton is improper. The only motivation results from improper reliance upon Appellant's

disclosure (i.e., the motivation for forming the combination must be something other than hindsight reconstruction based on using Appellant's invention as a road map for such a combination. *See, e.g., Interconnect Planning Corp. v. Feil*, 227 USPQ 543, 551 (Fed. Cir. 1985); *In re Mills*, 16 USPQ2d 1430 (Fed. Cir. 1990)).

Perhaps the failure of the Office to comply with the requirement of providing factual support of the motivation rationale results from the disparate teachings of the Walton and Drabek references. From the explicit teachings of Walton (e.g., Figs. 2-4), it is clear that such reference is directed towards an inductively coupled (magnetic) system while Drabek is directed towards a microwave system (e.g., Background of col. 1; col. 5, lines 25-40). Appellant submitted evidence during prosecution that the inductively coupled magnetic systems and microwave systems are recognized in the art as entirely different systems in terms of communications technology as well as application. Pages 21-22 of the *RFID Handbook* submitted with Appellant's Response dated November 17, 2003 discuss the differences between inductive (magnetic) coupled systems such as Walton versus long range systems which communicate at microwave frequencies (e.g., 2.45 GHz as recognized in col. 5 of Drabek).

Inductive (magnetic) coupled systems and microwave systems fundamentally operate in different ways. Magnetic systems rely upon relatively low frequency flux (13.56 MHz used in Walton at col. 7, lines 20-25) while microwave systems communicate at microwave frequencies (2.45 GHz used in Drabek). There is absolutely no evidence of record that the disparate microwave teachings may be incorporated into a magnetic system or that one of skill in the art concerned with magnetic systems would look to microwave systems for meaningful communications teachings. Appellant submits that the modification

proposed by the office would change the principle of operation of the magnetic system of Walton in order to incorporate microwave communications technology. As set forth in the MPEP and the predecessor of the Federal Circuit, "[i]f the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious." MPEP §2143.01 (8th ed., rev. 2) *citing In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959) (reversing a rejection wherein the "suggested combination of references would require a ... change in the basic principle under which the construction was designed to operate.") 270 F.2d at 813, 123 USPQ at 352.

Magnetic and microwave systems are classified and recognized in the art as entirely different systems, and the Office has failed to present any factual support or evidence regarding the ability to modify a magnetic system using circuitry designed for microwave communications. There is no evidence of record that teachings of a microwave system are applicable to or may be utilized with a magnetic system. To the contrary, the disparate systems are described separately in terms of the principle of operation and application in the art as discussed in the *RFID Handbook*. Even if modification was possible, such modifications to the magnetic system of Walton would be significant to incorporate the microwave teachings of Drabek and with the result of changing the principle of operation of Walton from a magnetic system to a microwave system. As mentioned above, changing the principle of operation of Walton illustrates that the Office has failed to establish a *prima facie* case of obviousness. Further, despite the mandate of the MPEP, the Office has failed to provide any evidence or factual support regarding the requisite motivational rationale to combine the disparate reference teachings. This failure combined with the

disparate communications technologies of Walton and Drabek illustrates the improper rejection of the claims over the teachings of Walton modified by the teachings of Drabek. For at least these reasons, Appellant respectfully requests reversal of the 103 rejections based upon a combination of the teachings of Walton and Drabek.

B. <u>The combination of the teachings of Brady with the teachings of Walton and Drabeck in support of an obviousness rejection is not proper and the rejection Of claims 65, 84, 86, 88, 90, 92, 94, 96, and 98 is in error.</u>

It is set forth in the Office Action (e.g., page 11) that the combination of Walton and Drabeck fail to disclose a battery. However, the Office relies upon the teachings of U.S. Patent No. 6,100,804 to Brady (herein "Brady") to cure the deficiencies of Walton and Drabeck. The reliance is misplaced.

More specifically, the present application is a continuation application which claims priority to 08/920,329 filed August 20, 1997. Brady was filed October 29, 1998 and claims benefit of a provisional application filed July 16, 1998. Brady has not been demonstrated by the Office to qualify as prior art and Appellant respectfully submits the rejection is improper for at least this reason.

Appellant respectfully requests reversal of the rejection of claims 65, 84, 86, 88, 90, 92, 94, 96, and 98 for at least the above-mentioned compelling reasons.

C. **The combination of the teachings of Walton and Drabeck fail to disclose or suggest the substrate and encapsulant limitations of claims 54-58, 65, 71-75, 80-81, 85-86, 93-94, and 103-106.**

Claims 54-58, 65, 71-75, 80-81, 85-86, 93-94, and 103-106 define in various forms a substrate and an encapsulant. The Examiner baldly relies upon the teachings of col. 6, lines 1-53 of Walton as allegedly teaching the claimed substrate and encapsulant with no identification of the Walton teachings relied upon as disclosing the substrate and those relied upon as disclosing the encapsulant. In col. 6, lines 44-53 of Walton it is stated that the assembly is encapsulated in a plastic rectangular bar 610. The plastic rectangular bar fails to disclose or suggest the claimed substrate having the support surface and also the encapsulant as claimed. The Office fails to reveal the specific structure of Walton relied upon as allegedly disclosing the claimed substrate and the encapsulant. Limitations of the above-recited claims are not shown nor suggested by the combination of reference teachings and the Office has failed to establish a proper *prima facie* obviousness rejection for at least this reason. Appellant respectfully requests allowance of the respective claims for at least this additional reason.

D. **The rejection of claims 102-106 over the combination of the teachings of Walton, Drabeck and Sawada is not proper.**

Initially, there is no motivation to combine the teachings of Sawada with the combination of Walton and Drabeck. The Office Action states on page 9 that the combination is appropriate "for the purpose of providing a ruggedized device." Appellant respectfully submits the alleged motivational rationale to support the combination of

Sawada is deficient.

More specifically, Appellant has electronically searched Sawada and has failed to uncover any teachings regarding a ruggedized device. The prior art is also deficient as to how using different materials of a substrate and an encapsulant is supposed to result in a ruggedized device. In consideration of the deficiencies of the art with respect to supporting the motivational rationale presented in the Action, it follows that the alleged rationale only improperly results form the personal knowledge of the Examiner. Regardless of the source of the alleged motivational rationale (none presented except for the subjective belief of the Examiner), it is clear the record is devoid of any evidence or factual support of the rationale. The record is devoid of explaining why different materials would provide a ruggedized device whereas the same structure using two of the same materials would not. Further, Walton already provides specific teachings regarding housing of internal circuitry. There is no evidence of record that the disclosed housing of Walton is deficient with respect to being rugged or that the housing of Walton would be made more rugged by the proposed combination.

Finally, Appellant notes that Sawada is directed towards encapsulation of semiconductor component such as a semiconductor die and is not directed to wireless communications. Appellant submits that one of skill in the art concerned with issues regarding providing a device capable of implementing wireless communications would not look to semiconductor device art which is not concerned with wireless communications for meaningful housing teachings. Semiconductor device fabrication art is not concerned with impacts of the structure with respect to the ability to receive or transmit radio frequency energy. There is no motivation to combine the teachings of Sawada and the Office has

failed to present a proper *prima facie* obviousness rejection of the respective claims. Claims 102-106 are allowable for at least this reason.

E. **The combination of the teachings of MacLellan with the teachings of Walton is not proper in support of the rejection of claims 83, 85, 87, 89, 91, 93, 95, 97, 99, and 100.**

Claims 83, 85, 87, 89, 91, 93, 95, 97, 99, and 100 recite in varied forms limitations with respect to backscatter communications. On pages 15-16 of the Action, the Office states that Walton in view of Drabek fails to teach backscatter communications and thereafter relies upon the teachings of MacLellan as teaching backscattering in combination with Walton in support of the rejection. The rejection is improper.

Initially, there is no motivation to combine the disparate reference teachings of MacLellan with the teachings of Walton in view of Drabek. As mentioned above, Walton is directed towards an inductive (magnetic) coupled system. As set forth in col. 5, lines 35-32, MacLellan is directed towards a microwave system. The Office Action and the prior art are devoid of any teaching or suggestion of implementing backscatter communications in an inductive (magnetic) coupled system. In fact, reflective properties of objects necessary for communications generally increase with increasing frequency including implementation at frequency ranges at 915 MHz or higher indicating that backscattering would be inapplicable to the magnetic flux coupling of Walton at relatively low frequencies of 13 MHZ. The Office has failed to present any factual support or evidence regarding the combining or applicability of backscattering techniques to inductive (magnetic) systems despite Appellant's response to Office Action mailed November 17, 2003 stating that the

there is no teaching in the art of such a combination. Further, there is absolutely no evidence or factual support ***anywhere*** that backscattering may be successfully implemented in an inductive (magnetic) coupled system. Accordingly, there is no motivation to combine the backscattering techniques applicable in a microwave system (i.e., MacLellan) to an inductive (magnetic) system (i.e., Walton). The conclusory subjective statements of the Examiner on pages 15-16 that the combination is appropriate "to better comply with the FCC regulatory requirement" is not factually supported by evidence in the record but is merely based upon conclusions of the Examiner which are insufficient to establish a *prima facie* obviousness rejection. The combination is improper and the respective claims are allowable for at least this reason.

Not only is there no motivation, there is no indication in the art or otherwise that there exists a reasonable expectation of success of implementing backscattering techniques in an inductive (magnetic) coupled (i.e., relatively low frequency) system of Walton. The Office has failed to comply with this second requirement of establishing a *prima facie* 103 rejection and the above-mentioned claims are allowable for at least this additional reason.

F. **The combination of Walton and Drabek fails to teach limitations of claim 101.**

Claim 101 recites the wireless communication device of claim 50 further comprising a *transmit antenna* configured to transmit microwave signals and a *receive* antenna configured to receive microwave signals. The Office Action on page 8 recites teachings of Drabek relied upon in support of the rejection of claim 101. However, the Office relies

upon the teachings of a single antenna 102 as allegedly disclosing the plural transmit and receive antennas positively defined in claim 101. The single dipole antenna 102 fails to disclose both the dedicated transmit antenna and the dedicated receive antenna defined in claim 101, and accordingly, even if the teachings of Drabeck are combined with the teachings of Walton, the combination fails to disclose or suggest limitations of claim 101. Claim 101 is allowable for at least this reason.

G. **The combination of Walton, Drabeck and Sawada fails to disclose or suggest the claimed limitations of claims 102-103.**

The reliance by the Office upon the teachings of Sawada to cure the deficiencies of Walton and Drabeck with respect to the limitations of claims 102-103 is misplaced. For example, even if the disparate teachings of the three references are combined, the combination fails to disclose or suggest limitations of claims 102-103. The Sawada teachings identified by the Office fail to disclose *a substrate and encapsulant as comprising different materials* as positively claimed. Sawada merely discloses in col. 9, lines 35-45 and col. 10, lines 1-2 that the chip may be mounted on the substrate with no teaching or suggestion of the substrate comprising a different material than an encapsulant. In fact, Sawada is devoid of any details regarding the material composition of the substrate. Accordingly, even if the reference teachings of Sawada are combined, the combination fails to disclose or suggest positively recited limitations of claims 102-103 and such claims are allowable for at least this reason.

Further, with respect to claim 102, such claim positively recites that the *encapsulant and the substrate encapsulate an entirety of the communication circuitry and the antenna.*

Contrary to 37 C.F.R. §1.104, the Office has failed to identify any teachings of record which disclose any encapsulation of an entirety of an antenna let alone the claimed encapsulation using the encapsulant and the substrate. Appellant submits that even if the three references are combined, the combination fails to disclose the claimed encapsulation. For example, Fig. 6 of Walton discloses an *outwardly exposed magnetic antenna rod 216* which is not entirely encapsulated as claimed. Drabeck fails to disclose or suggest teachings regarding encapsulation of an entirety of an antenna as claimed and Appellant has electronically searched and failed to uncover any antenna teachings in Sawada. Accordingly, the prior art is devoid of disclosing or suggesting positively-recited limitations of claim 102 and claim 102 is allowable for this additional reason.

H. **The combination of Walton, Drabeck and Sawada fails to disclose or suggest the claimed limitations of claim 104.**

Claim 104 recites that the *substrate* and the *encapsulant* form a *solid mass substantially free of any void space*. The Office on page 9 states that the combination of Walton and Drabeck does not disclose limitations of claim 104 and thereafter relies upon teachings of Sawada. The rejection over the three references is improper. For example, even if the teachings of the references are combined, the combination fails to disclose or suggest the claimed substrate and encapsulant forming a solid mass substantially free of any void space as defined. The Office cites teachings in col. 2, lines 34-42 of Sawada in support of the rejection and as allegedly teaching that Sawada discloses the solid mass substantially free of any void space. However, the identified teachings merely disclose that convex portions of the encapsulating member contact with the surface of the active

element of the chip and pressing the encapsulating member to encapsulate the chip. Appellant submits that in no fair interpretation may the mere encapsulation as described in Sawada be construed to fairly disclose a *solid mass substantially free of void space* as claimed. Encapsulation may occur without forming a resultant solid device. Accordingly, even if the prior art reference teachings are combined, the combination fails to disclose or suggest positively recited limitations of claim 104 and claim 104 is allowable for at least this additional reason.

I. **Walton fails to teach limitations of claims 59, 61, 76, and 78.**

Claims 59, 61, 76 and 78 recite in varying form communication circuitry in combination with an encapsulant configured to encapsulate and contact at least a portion of the communication circuitry or which contacts at least an encapsulated portion of the communication circuitry. The Office Action at page 3 identifies radio frequency identifier circuit 212 as allegedly disclosing the claimed communication circuitry. Thereafter, the Action identifies the plastic rectangular bar 610 as allegedly disclosing the claimed encapsulant. The teachings of Walton fail to disclose or suggest limitations of independent claim 59 or independent claim 76.

At page 3 of the Action, the Examiner referring to col. 6, lines 44-53 of Walton states that an "assembly" is encapsulated in a plastic rectangular bar 610 as set forth in lines 45-47 of Walton. However, col. 6, lines 44-53 of Walton relied upon by the Examiner fails to include any teaching of *bar 610 contacting identifier circuit 212* or any other circuitry which may be fairly considered to disclose Appellant's communication circuitry. On pages 2-3 of a Final Office Action dated February 17, 2004 from which Appellant's originally

appealed, the Examiner appears to rely upon the teachings of antenna rod 216 in support of the rejections of independent claims 59 and 76. The Examiner baldly states on page 3 of the Final Office Action that rod portion 216 is "encapsulated or contacted." However, the Examiner fails to identify, contrary to the requirements of 37 C.F.R. §1.104(c)(2), any teachings of the prior art which support the allegation that circuit 212 or rod 216 or any other circuitry considered to teach the claimed communication circuitry is contacted by an encapsulant. The Office Action dated July 11, 2005 fails to cure the deficiencies of the rejection of the Office presented in the Final Office Action dated February 17, 2004. Walton is void of any teaching to support the bald allegation of the Examiner in support of the rejection of independent claims 59 and 76. In particular, Walton is void of any disclosure of the bar 610 contacting communication circuitry.

Still referring to the anticipation rejection of independent claims 59 and 76, Appellant notes the requirements of MPEP §2131 (8th ed., rev. 2), which states that TO ANTICIPATE A CLAIM, THE REFERENCE MUST TEACH EVERY ELEMENT OF THE CLAIM. This MPEP section further states that a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

Appellant has electronically searched Walton and has failed to uncover any teachings of an encapsulant contacting commination circuitry as claimed. There is no

argument from the Examiner or the Office that the contacting limitations of independent claims 59 or 76 are considered to be inherent and such an argument would be flawed inasmuch as the contacting limitations of claims 59 and 76 do not necessarily flow from the teachings of Walton. Independent claims 59 and 76 individually recite limitations which are not disclosed nor suggested by the prior art and claims 59 and 76 are allowable for at least this reason. Appellant respectfully requests reversal of the anticipation rejection of claims 59, 61, 76 and 78 for at least the above-recited compelling reasons.

J. **The refusal of the Office to initial or address a submitted Form PTO-1449 is not proper.**

Appellant mailed a Supplemental Information Disclosure Statement, the reference cited thereon, and the appropriate fee pursuant to 37 C.F.R. 1.97 to the patent office on October 21, 2002. Appellant received a stamped post card indicating receipt of the IDS and the reference cited on the accompanying form PTO-1449 by the Office. The Office Actions mailed January 2, 2003, July 16, 2003, February 17, 2004 and July 11, 2005 failed to include the form PTO-1449 with the Examiner's initials thereon indicating consideration of the reference by the Examiner. Appellant included courtesy copies of the IDS with Office Action responses mailed May 2, 2003 and November 17, 2003 and requested therein that the form PTO-1449 be initialed. Appellant has yet to receive the properly initialed form PTO-1449 or a response from the Examiner regarding this issue. Pursuant to MPEP § 609 (8th ed, rev. 2), Appellant respectfully requests that the form be appropriately initialed and a copy of the initialed form be returned to Appellant.

K. **Conclusion.**

In view of the foregoing, reversal of the final rejections of the claims is respectfully requested. For any one of the above-stated reasons, the rejections of the claims should be reversed. In combination, the above-stated reasons overwhelmingly support such reversal. Accordingly, Appellants respectfully request that the Board reverse the rejections of claims 50-52, 54-69, and 71-106.

Respectfully submitted,

Date: 11/14/05 Attorney: _____

James D. Shaurette
Reg. No. 39,833

IX. APPENDIX A – THE CLAIMS INVOLVED IN THIS APPEAL.

Claims 1-49 are canceled.

50. [Previously Presented] A wireless communication device comprising:

a housing including an upper surface, a lower surface, and at least one side intermediate the upper surface and the lower surface and having a dimension less than smallest dimensions of the upper surface and the lower surface, and the at least one side surface having visibly perceptible indicia thereon;

communication circuitry within the housing and the communication circuitry being configured to communicate wireless signals comprising microwave signals individually having a frequency in excess of about 900 MHZ; and

wherein the communication circuitry comprises radio frequency identification device circuitry.

51. [Previously Presented] The device according to claim 50 wherein the housing comprises an encapsulant which contacts the communication circuitry.

52. [Previously Presented] The device according to claim 50 wherein the at least one side surface has a dimension less than about 100 mils.

53. Canceled.

54. [Previously Presented] A wireless communication device comprising:

a substrate having a support surface defined by a perimetral edge;

communication circuitry elevationally over the support surface of the substrate and configured to communicate wireless signals comprising microwave signals; and

an encapsulant elevationally over the support surface and configured to encapsulate at least portions of the support surface of the substrate and the communication circuitry, and wherein the encapsulant and the substrate respectively define an upper surface and a lower surface and have a thickness less than a smallest dimension of the perimetral edge, and the encapsulant includes visibly perceptible indicia intermediate the upper surface and the lower surface.

55. [Previously Presented] The device according to claim 54 wherein the support surface comprises a surface substantially in the shape of a rectangle.

56. [Previously Presented] The device according to claim 54 wherein the encapsulant contacts at least portions of the support surface and the communication circuitry.

57. [Previously Presented] The device according to claim 54 wherein the encapsulant and the substrate have a thickness less than about 100 mils.

58. [Previously Presented] The device according to claim 54 wherein the communication circuitry comprises radio frequency identification device circuitry.

59. [Previously Presented] A wireless communication device comprising:

communication circuitry configured to communicate wireless signals; and

an encapsulant configured to encapsulate and contact at least a portion of the communication circuitry, wherein the encapsulant defines at least one side surface and the at least one side surface has visibly perceptible information thereon.

60. [Previously Presented] The device according to claim 59 wherein the at least one side surface of the encapsulant has a thickness less than about 100 mils.

61. [Previously Presented] The device according to claim 59 wherein the communication circuitry comprises radio frequency identification device circuitry.

62. [Previously Presented] A radio frequency identification device comprising:

a housing including an upper surface and a lower surface which define a housing thickness of less than about 100 mils intermediate the lower surface and the upper surface, and the housing has visibly perceptible indicia thereon intermediate the upper surface and the lower surface; and

communication circuitry within the housing and configured to communicate wireless signals comprising microwave signals.

63. [Previously Presented] The device according to claim 62 wherein the housing comprises an encapsulant which contacts at least portions of the support surface and the communication circuitry.

64. [Previously Presented] The device according to claim 62 further comprising an antenna within the housing and coupled with the communication circuitry.

65. [Previously Presented] A radio frequency identification device comprising:

a substrate having a support surface;

radio frequency identification device circuitry elevationally over the support surface and configured to communicate wireless signals comprising microwave signals;

a power source elevationally over the support surface and coupled with the radio frequency identification device circuitry, wherein the power source comprises a battery;

an antenna elevationally over the support surface and coupled with the radio frequency identification device circuitry; and

an encapsulant contacting at least portions of the support surface, the radio frequency identification device circuitry, the power source and the antenna, wherein the encapsulant and the substrate form a housing having an upper surface and a lower surface interconnected by at least one side surface, and the at least one side surface has a dimension less than smallest dimensions of the upper and lower surfaces, and the at least one side surface includes visibly perceptible indica.

66. [Previously Presented] A method of forming a wireless communication device comprising:

providing communication circuitry configured to communicate wireless signals;

providing a housing including an upper surface, a lower surface and at least one side surface about the communication circuitry, the at least one side surface has a dimension less than smallest dimensions of the upper surface and the lower surface;

providing visibly perceptible indicia on the at least one side surface; and

wherein the providing communication circuitry comprises providing radio frequency identification device circuitry configured to communicate microwave wireless signals.

67. [Previously Presented] The method according to claim 66 wherein the providing the housing comprises encapsulating at least a portion of the communication circuitry with an encapsulant.

68. [Previously Presented] The method according to claim 67 wherein the encapsulating comprises contacting at least the encapsulated portion of the communication circuitry with the encapsulant.

69. [Previously Presented] The method according to claim 66 wherein the at least one side surface has a dimension less than about 100 mils.

70. Canceled.

71. [Previously Presented] A method of forming a wireless communication device comprising:

providing a substrate having a support surface defined by at least one perimetral edge;

providing communication circuitry elevationally over the support surface of the substrate and configured to communicate wireless signals;

encapsulating at least portions of the support surface of the substrate and the communication circuitry using an encapsulant, the encapsulant and the substrate respectively define an upper surface and a lower surface and have a thickness less than a smallest dimension of the at least one perimetral edge; and

providing visibly perceptible indicia on the encapsulant intermediate the upper surface and the lower surface.

72. [Previously Presented] The method according to claim 71 wherein the providing the substrate comprises providing the substrate having a substantially rectangular shape.

73. [Previously Presented] The method according to claim 71 wherein the encapsulating comprises contacting at least the encapsulated portions of the support surface of the substrate and the communication circuitry with the encapsulant.

74. [Previously Presented] The method according to claim 71 wherein the encapsulant and the substrate have a thickness less than about 100 mils.

75. [Previously Presented] The method according to claim 71 wherein the providing communication circuitry comprises providing radio frequency identification device circuitry.

76. [Previously Presented] A method of forming a wireless communication device comprising:

providing communication circuitry configured to communicate wireless signals;

encapsulating at least a portion of the communication circuitry with an encapsulant which contacts at least the encapsulated portion of the communication circuitry, the encapsulant forming at least one side surface; and

providing visibly perceptible indicia upon the at least one side surface of the encapsulant.

77. [Previously Presented] The method according to claim 76 wherein the at least one side surface of the encapsulant has a dimension less than about 100 mils.

78. [Previously Presented] The method according to claim 76 wherein the providing communication circuitry comprises providing radio frequency identification device circuitry.

79. [Previously Presented] A method of forming a radio frequency identification device comprising:

providing radio frequency identification device circuitry configured to communicate wireless signals comprising microwave signals;

providing a housing including an upper surface, a lower surface, and at least one side surface about the communication circuitry, the at least one side surface having a dimension less than about 100 mils; and

providing visibly perceptible indicia on the at least one side surface.

80. [Previously Presented] The method according to claim 79 wherein the providing the housing comprises providing an encapsulant over at least a portion of a support surface of a substrate.

81. [Previously Presented] The method according to claim 80 wherein the encapsulant contacts at least portions of the support surface and the radio frequency identification device circuitry.

82. [Previously Presented] A method of forming a radio frequency identification device comprising:

providing radio frequency identification device circuitry configured to communicate wireless signals comprising microwave signals;

coupling a power source with the radio frequency identification device circuitry;

coupling an antenna with the radio frequency identification device circuitry;

providing a housing including an upper surface, a lower surface and at least one side surface about at least portions of the radio frequency identification device circuitry, the power source and the antenna, the at least one side surface having a dimension less than smallest dimensions of the upper surface and the lower surface; and

providing visibly perceptible indicia on the at least one side surface.

83. [Previously Presented] The device according to claim 50 wherein the communication circuitry is configured to implement backscatter communications.

84. [Previously Presented] The device according to claim 50 further comprising a battery coupled with the communication circuitry.

85. [Previously Presented] The device according to claim 54 wherein the communication circuitry is configured to implement backscatter communications.

86. [Previously Presented] The device according to claim 54 further comprising a battery coupled with the communication circuitry.

87. [Previously Presented] The device according to claim 59 wherein the communication circuitry is configured to implement backscatter communications.

88. [Previously Presented] The device according to claim 59 further comprising a battery coupled with the communication circuitry.

89. [Previously Presented] The device according to claim 62 wherein the communication circuitry is configured to implement backscatter communications.

90. [Previously Presented] The device according to claim 62 further comprising a battery coupled with the communication circuitry.

91. [Previously Presented] The method according to claim 66 wherein the providing communication circuitry comprises providing backscatter communication circuitry.

92. [Previously Presented] The method according to claim 66 further comprising electrically coupling a battery with the communication circuitry.

93. [Previously Presented] The method according to claim 71 wherein the providing communication circuitry comprises providing backscatter communication circuitry.

94. [Previously Presented] The method according to claim 71 further comprising electrically coupling a battery with the communication circuitry.

95. [Previously Presented] The method according to claim 76 wherein the providing communication circuitry comprises providing backscatter communication circuitry.

96. [Previously Presented] The method according to claim 76 further comprising electrically coupling a battery with the communication circuitry.

97. [Previously Presented] The method according to claim 79 wherein the providing the radio frequency identification device circuitry comprises providing backscatter circuitry.

98. [Previously Presented] The method according to claim 79 further comprising electrically coupling a battery with the radio frequency identification device circuitry.

99. [Previously Presented] A wireless communication device comprising:

a housing including an upper surface, a lower surface, and at least one side intermediate the upper surface and the lower surface and having a dimension less than smallest dimensions of the upper surface and the lower surface, and the at least one side surface having visibly perceptible indicia thereon; and

communication circuitry within the housing and the communication circuitry being configured to communicate wireless signals;

wherein the communication circuitry is configured to implement backscatter communications.

100. [Previously Presented] A method of forming a wireless communication device comprising:

providing communication circuitry configured to communicate wireless signals;

providing a housing including an upper surface, a lower surface and at least one side surface about the communication circuitry, the at least one side surface has a dimension less than smallest dimensions of the upper surface and the lower surface; and

providing visibly perceptible indicia on the at least one side surface;

wherein the providing communication circuitry comprises providing backscatter communication circuitry.

101. [Previously Presented] The device according to claim 50 further comprising a transmit antenna configured to transmit microwave signals and a receive antenna configured to receive microwave signals.

102. [Previously Presented] The device according to claim 51 further comprising:

an antenna coupled with the communication circuitry and configured to communicate the wireless signals; and

a substrate comprising different material than the encapsulant, and wherein the encapsulant and the substrate encapsulate an entirety of the communication circuitry and the antenna.

103. [Previously Presented] The device according to claim 54 wherein the substrate and the encapsulant comprise different materials.

104. [Previously Presented] The device according to claim 54 wherein the substrate and the encapsulant form a solid mass substantially free of any void space.

105. [Previously Presented] The device according to claim 54 further comprising an antenna coupled with the communication circuitry and configured to communicate the wireless signals, and wherein the substrate and the encapsulant encapsulate an entirety of the communication circuitry and the antenna.

106. [Previously Presented] The method according to claim 66 wherein the providing the housing comprises:

providing a substrate;

flowing a flowable encapsulant over the substrate; and

curing the flowable encapsulant into a solid mass substantially free of any void space.

107. Cancel.

X. EVIDENCE APPENDIX.

A copy of the reference "*RFID Handbook*" pages 20-22 (enclosed) was entered into the record by Appellant's Response dated November 17, 2003.

WILEY

RFID HANDBOOK

Radio-Frequency Identification Fundamentals and Applications

KLAUS FINKENZELLER

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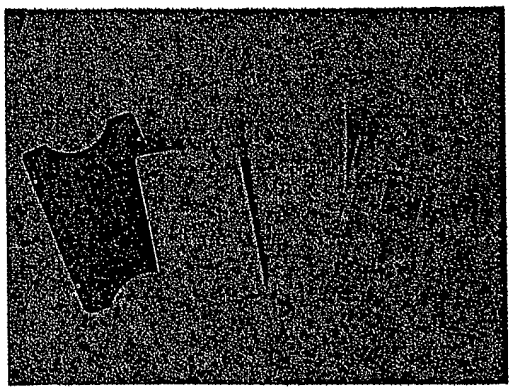

Figure 2.12: Microwave transponders in plastic shell housings (Reproduced by permission of Pepperl & Fuchs GmbH)

2.2.8 *Other formats*

In addition to these main designs, several application-specific special designs are also manufactured. Examples are the "racing pigeon transponder" or the "champion chip" for sports timing. Transponders can be incorporated into any design required by the customer. The preferred options are glass or PP transponders, which are then processed further to obtain the ultimate form.

2.3 Frequency, Range and Coupling

2.3.1 *Close coupling*

RFID systems with a very small range, typically in the region of 0 to 1 cm are known as close coupling systems The transponder must either be incorporated within a reader or positioned upon a surface provided for this purpose.

Close coupling systems can be operated at any desired frequency between DC and 30 MHz, because the operation of the transponder does not rely upon the radiation of electromagnetic waves. The close coupling between data carrier and reader also facilitates the provision of greater amounts of power, even for the operation of a microprocessor that does not have an optimal power consumption. Close-coupled systems are primarily used in applications that are subject to strict security requirements, but do not require a large range. Examples are electronic door locking systems or contactless smart card systems with payment functions. Close-coupled transponders are currently used exclusively as contactless smart cards in ID-1 format.

2.3.2 *Remote coupling*

Systems with write and read ranges of up to 1 m are known as remote-coupled. All *remote-coupled systems* are based upon an *inductive (magnetic) coupling* between reader and transponder. These systems are therefore also known as *inductive radio systems*. Around 90 – 95 % of all RFID systems purchased are inductively coupled systems.

Frequencies below 135 kHz or the frequencies 6.75 MHz, 13.56 MHz and 27.125 MHz are used as transmission frequencies. The power that can be transmitted by inductive coupling is very low and depends upon the distance between transponder and reader, so normally only read only data carriers with very low power consumption are used. However, high end systems with microprocessor transponders have also moved into the field of inductively coupled systems.

In order to avoid reference to a possibly erroneous ranges, this book uses only the term inductive (coupled) systems for classification.

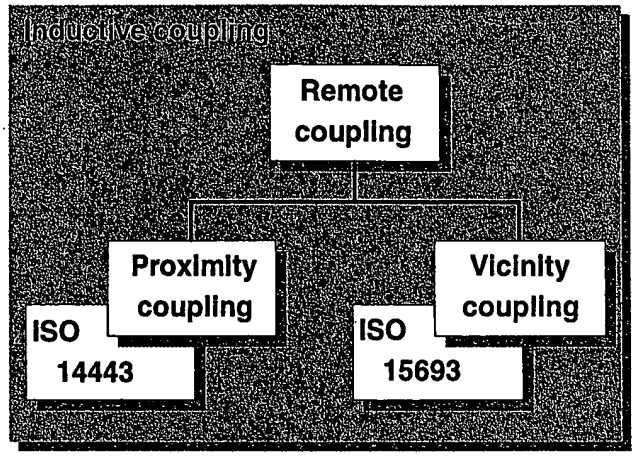

Figure 2.13: In contactless smart cards a differentiation is also made between proximity coupling (typically 15 cm) and vicinity coupling (approximately 1 m)

2.3.3 *Long range*

Long range systems are available for ranges typically between 1 m and 10 m. However, there are also individual systems that can cope with significantly greater ranges. All long range systems operate using electromagnetic waves in the *microwave range*. The transmission frequency is normally 2.45 GHz, however there are systems that operate at 915 MHz (not permitted in Europe), 5.8 GHz and 24.125 GHz.

The power supplied is never sufficient to provide the transponder with enough energy to operate a microchip. Long range systems (with the exception of surface wave transponders) therefore possess an auxiliary battery. This does not provide the power for data transfer

between transponder and reader, but serves exclusively to supply the microchip and to retain stored data.

Communication between transponder and reader uses only the HF energy received from the reader. The backscatter procedure (modulated echo crosssection) is the standard procedure used for data transfer between transponder and reader.

In order to avoid reference to a possibly erroneous range figure, this book uses only the terms *microwave systems* or *backscatter system* for classification.

2.3.4 *System performance*

One option for classifying RFID systems is to divide them according to the range of functions offered by the system, the *system performance*. If we classify all the RFID systems available on the market by their range of functions, i.e. by the memory size of the data carrier, transaction speed, range and cryptographic functions, then low end and high end systems represent the two extremes of the total spectrum.

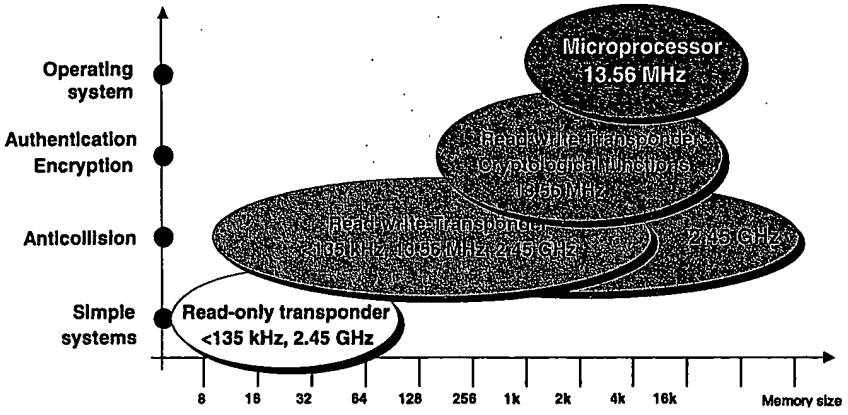

Figure 2.14: RFID systems can be classified into low end and high end systems according to their functionality

- *Read only systems* form the bottom end of *low end systems*. Read only means that data can be read from the data carrier, but cannot be written back to it. The data record of a read only chip normally consists only of an unique serial number made up of several bytes. If a read only transponder is placed in the HF field of a reader then the transponder begins to broadcast its own serial number. It is not possible for the reader to address a read only transponder – there is a unidirectional flow of data from the transponder to the reader. In practical operation of a read only system, it is also necessary to ensure that there is only ever one transponder in the reader's interrogation zone, otherwise the two or more transponders simultaneously transmitting would lead to a data collision. The reader would no longer be able to recognise any logical data.
  Despite this limitation, read only transponders are excellently suited for many applications in which the reading of one unique number is sufficient. Because of the

XI. RELATED PROCEEDINGS APPENDIX.

Appellants are not aware of any related proceedings.